Navigation between the Southern Pacific and Northern Electric Bridges was impeded at various times during the month by sand deposits.

A shortage of water in the foothills and mountains has been general and has resulted in the suspension of several mines and power plants. Water for irrigation purposes has become alarmingly scarce.

Lower San Joaquin watershed.—All streams in this watershed remained at low stages, there being little difference between the average stages of the present month and those of the month preceding.

Practically no precipitation occurred in any section of either watershed during the month.

NOTES ON STREAMS AND WEATHER OF THE UPPER SAN JOAQUIN WATERSHED.

By W. E. BONNETT, Local Forester.

Phenomenal rains in the mountains during the last decade of August had raised the streams to unusual stages for that month and the increased flow continued at all points during the first week of September. This resulted in mean stages for September that are quite close to the averages for the last seven years, although the snow cover in the mountains which is the only source of summer supply in ordinary years had promised very low September stages this year. The highest stages at all points were recorded on the 1st or 2d, followed by a gradual fall during the first half of the month after which the stages were low and practically stationary.

No September of recent years has been so favorable for raisin making as the one just closed. Twenty-eight days were clear, there was 95 per cent of the possible sunshine and the per cent of humidity was very low, so that drying has gone on under the most favorable conditions and the bulk of the crop is safe in stack at the close of the month. But one rain warning was issued, that of the 20th, and it was amply justified in the sharp local showers that fell at nearby points. While it is not the highest of record for September, the maximum of 107° on the 18th is noteworthy for the late date in the month on which it occurred.

THE SEPTEMBER HOT WAVE IN LOS ANGELES, CAL.

By FORD A. CARPENTER, Local Forecaster.

The year 1913 will go down in the meteorological history of southern California as a record breaker of extremes in temperature. In many localities the early part of the year witnessed the lowest temperatures ever known, although records extend to 1849, and during the latter half of the year heat records were also broken. On September 17, 80° was the highest minimum temperature ever recorded in Los Angeles, and the highest temperature, 108°, on that day was within 1° of the absolute maximum for the station, 109° on July 25, 1891. That such conditions are uncommon may be gained from the fact that this temperature was 26° higher than the mean daily maximum for the month from 37 years' record at this station. Otherwise September was a typical month, the mean highest temperature being only 2° above the daily normal maximum.

MONTHLY AND ANNUAL DISTRIBUTION OF TEMPERATURES OF 100° AND OVER AT LOS ANGELES, CAL.

Year.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total.
1877								0
1878						[6] 103		3
1879			[1] 104			[1] 101		4
1880								0
1881					100	102		2
1882						100		1
1883		100	100			[2 6] 104		6
1884					[2] 102			2
1885					[2 5] 106	108	102	5
1886								0
1887			100					1
1888								0
1889						103		1
1890			[3] 105					2
1891				109		100		2
1892								0
1893								0
1894								0
1895			100					1
1896		103						1
1897								0
1898								0
1899							100	1
1900								0
1901								0
1902								0
1903								0
1904								0
1905					101			1
1906						105		1
1907				[1 3] 103	101			4
1908								0
1909					101	[3] 103		3
1910	100							1
1911								0
1912						100		1
1913						108		(1)
Total	1	2	7	6	8	17	2	(44)

References: [1] also 100; [2] also 101; [3] also 102; [4] also 103; [5] also 104; [6] 102 twice.

Month with maximum number, September 17
Year with maximum number, 1883 6
Average number per year (over) 1

Remarks.—The absolute highest temperature, 109°, was registered on July 25, 1891.

The cause of this hot spell, like all instances of temperatures above 90° in this portion of southern California, was a well-defined "norther" condition brought about by pressure distribution typical of such phenomena.

On September 15 the barometric pressure was high over the northwest and low in the southwest. While the low area remained stationary for many days, the high area progressed in a southeasterly direction. The greatest difference in pressure was coincident with the warmest day, when the weather map showed a gradient of a tenth of an inch in barometric pressure to the hundred miles on an east and west line.

The effect of this pressure distribution on the weather in the coast districts of southern California was so give that region the driest and warmest day on record. Previous records were broken at surrounding stations, notably that of San Diego, which has the longest unbroken series of observations in this section. At that station the thermometer rose 9° higher than ever before recorded, and 33° above the mean daily maximum temperature of the month.

The Los Angeles thermogram and hygrogram of the four-day period presents an excellent example of the relationship between temperature and moisture in southern

California during days when the thermometer rises above 90°. The trace sheets of the thermograph and hygrograph show that the day preceding and following the hot day were normal September days with moderately high temperatures, 99° and 90°, and nearly normal humidities, 66 per cent and 65 per cent. At 1.30 p. m. on September 17, the time of the highest temperature of 108°, the relative humidity was 4 per cent as determined by whirled psychrometer observations.

Growers of vegetables and tender plants suffered loss by the extreme dryness, and some of the walnut groves sustained damage. The physical effect of the hot and dry air was not detrimental to the health or business activities of the community. There was an absence of prostration cases from the hospital records and business progressed without interruption. Owing to the extreme dryness of the air animals did not suffer from the heat except rabbits, many of them dying from the unusual conditions. Incidentally there was considerable financial loss occasioned by forest and city fires. On the day of the greatest heat the city fire department responded to 21 fires, which necessitated the use of about 75 million gallons of water, equaling the amount used for domestic purposes by the city on a normal day.